SCOTTSDALE TRANSPORTATION COMMISSION REPORT

To: **Transportation Commission**
From: **George Williams, Principal Traffic Engineer**
Subject: **Roadway Safety Assessment of Greenway-Hayden and Frank Lloyd Wright**
Meeting Date: **May 21, 2015**

ITEM IN BRIEF

Action: Information

Purpose:
Discuss the current evaluation process and reporting format for Roadway Safety Assessments that Traffic Engineering has developed.

Background:
In May of 2014, the Traffic Volume and Collision Rate Data Report was presented to the Transportation Commission. As discussed, one of the products of the data collection is the identification of the street intersections and segments that experience the highest number and rate of collisions. Traffic Engineering performs a review of collision trends, conducts field observations, and makes recommendations to improve safety at these locations. These are referred to as Roadway Safety Assessments (RSA's).

In order to improve our efficiency and better understand the systematic collision trends in Scottsdale, Traffic Engineering has improved the Roadway Safety Assessment process and reporting. Staff is currently working to complete the assessments for the highest collision intersections identified in the 2012 report. Once the 2014 report is finalized, Traffic Engineering will begin the safety assessment for any new intersections that are identified in 2014.

Process:
Once identified, the study locations are assigned to a Traffic Engineer and a Traffic Engineering Technician for evaluation and observations. A safety specialist (typically a Principal Traffic Engineer) also participates in the analysis. Collision trends are identified, observations are noted, and mitigations measures are proposed and evaluated. A summary list of identified issues and potential mitigation measures are created and a report for each intersection is produced. During the past year Traffic Engineering has been working to develop an improved and more easily understandable road safety assessment report for each of the top crash intersections.

The focus of tonight's presentation is the Frank Lloyd Wright Boulevard (FLW) and Greenway-Hayden (GH) Loop intersection report which will be presented as an example of the current process and reporting format. This is the intersection of two arterial streets, FLW which is three lanes in each direction and Greenway Hayden Loop which has two lanes in each direction. Based on a review of the crash data, the most significant crash pattern is the westbound-westbound rear end collision and those crashes are happening primarily during lunch peak traffic periods. The detailed crash information is provided in the attachments. Upon observation, it was determined that there is a significant queuing of vehicles in the median lane for the westbound through movement. Upon further analysis, the queue length for the lane is due to the high demand to make left turns further downstream from the intersection. This median lane queue results in a significant differential in speeds between the middle and median westbound through travel lanes approaching the intersection and is a significant contributing factor in the westbound rear end crashes. To address this pattern, we are looking at a combination of signal timing adjustments and supplemental signing. A summary of the issues and potential recommendations is included as part of the standard report and is shown below.

Table 1: Intersection currently in the Roadway Safety Assessment process:

Rank	North/South	East/West	Summary	Diagram	Observe	Report	Comments
1	101 FWY	FRANK LLOYD WRIGHT	X	X	X		
2	HAYDEN	THOMAS					In Design
3	SCOTTSDALE	THOMAS				X	External RSA
4	SCOTTSDALE	CACTUS	X	X	X		
5	68TH	THOMAS	X	X	X		
6	HAYDEN	MCDOWELL	X	X	X		
7	101 FWY	RAINTREE	X	X	X		
8	92ND	SHEA	X	X	X		
9	90TH	SHEA	X	X	X		
10	SCOTTSDALE	MCDOWELL	X	X	X		
11	GREENWAY/HAYDEN	FRANK LLOYD WRIGHT	X	X	X	X	
12	MILLER	THOMAS	X	X	X		
13	SCOTTSDALE	CAMELBACK	X	X	X		
14	SCOTTSDALE	THUNDERBIRD	X	X	X		
15	HAYDEN	CHAPARRAL				X	External RSA
16	SCOTTSDALE	INDIAN BEND	X	X	X		
17	SCOTTSDALE	SHEA	X	X	X		
18	SCOTTSDALE	INDIAN SCHOOL	X	X	X		
19	SCOTTSDALE	101 FREEWAY	X	X	X		
20	SCOTTSDALE	DYNAMITE					Implemented

Table 2: Summary of the Issues and Recommendations for FLW and GH-Loop intersection

Greenway-Hayden Loop and Frank Lloyd Wright Boulevard RSA Recommendations			
Item #	***Issue***	***RSA Suggestion/COS plan***	
1	Long WB median lane queues, potentially causing WB skid marks and WB rear-end collisions	**a**	Vehicle detector 300' east and "Congestion Ahead" warning sign 600' east
		b	Speed awareness sign 600' east
		c	Lengthen WB through green
2	SB signal heads were partially obscured by roadway curvature and vegetation and may be causing SB red-light running collisions	**d**	Extend SB signal mast arm or install SB signal head on NB mast arm
		e	Trim vegetation
		f	SB signal warning sign
3	NB right-turn queuing beyond the limits of the right turn bay	**g**	NB right-turn arrow with WB u-turn prohibition
4	Long EB curb lane queues, potentially causing EB rear-ends	**h**	Vehicle detector 300' west and "Congestion Ahead" warning sign 600' west
		i	Speed awareness sign 600' west
		j	Lengthen EB through green

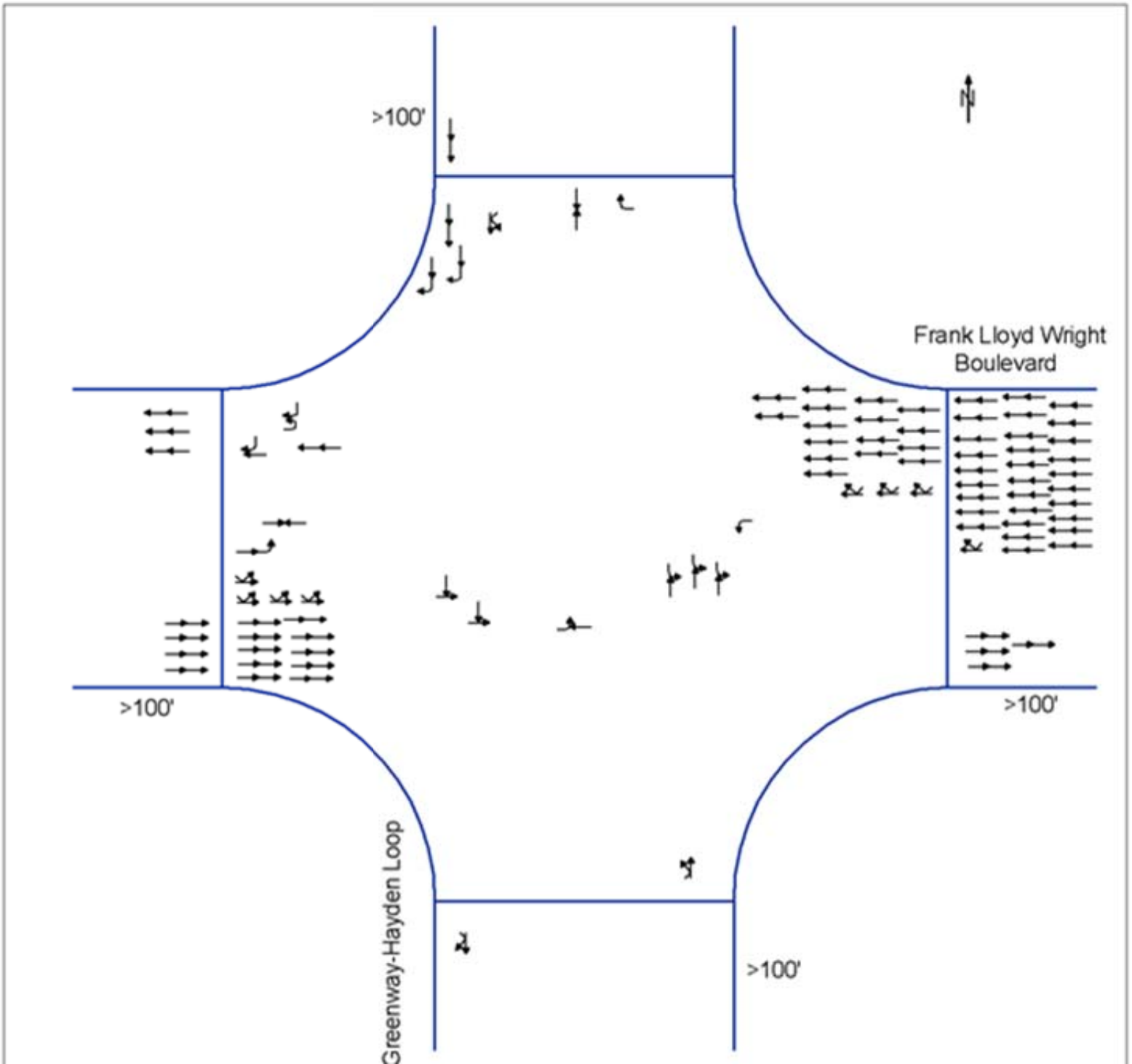
Staff Contact: George Williams, Principal Traffic Engineer, 480-312-7623, gwilliams2@Scottsdaleaz.gov

Collision data from 2012 and 2013 was analyzed for the intersection of Greenway-Hayden Loop and Frank Lloyd Wright Boulevard. This data is contained in *Appendix C*.

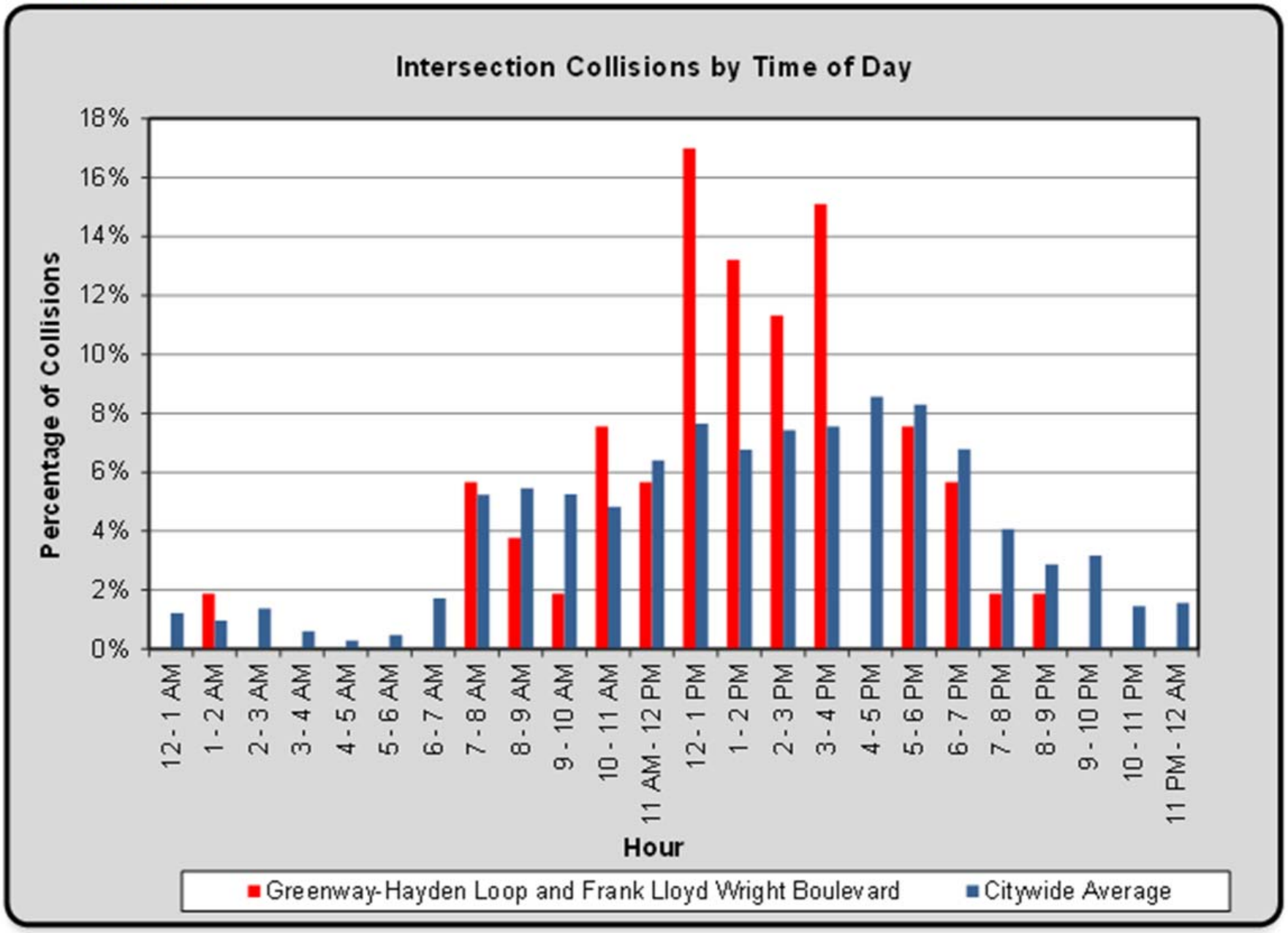
A collision diagram for the intersection of Greenway-Hayden Loop and Frank Lloyd Wright Boulevard is shown below. Based on the diagram, the significant collision trends are:

- Westbound rear-end
- Eastbound rear-end
- Westbound sideswipe
- Eastbound sideswipe
- Southbound angle
- Southbound left-turn-head-on

Diagram 1: Collision Diagram for Greenway-Hayden Loop and Frank Lloyd Wright Boulevard

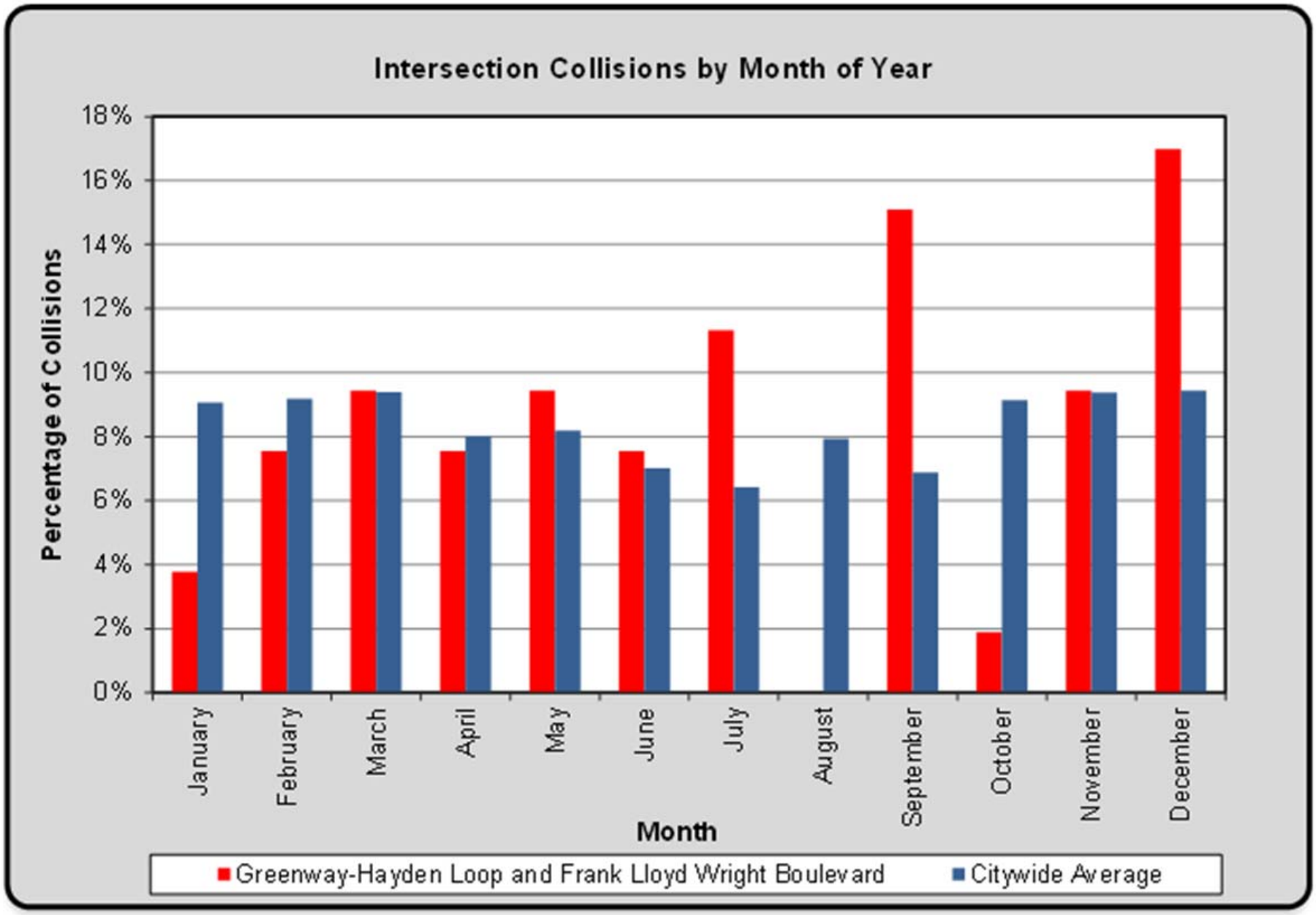


Graph 1: Collisions by Time of Day: Greenway-Hayden Loop and Frank Lloyd Wright Boulevard



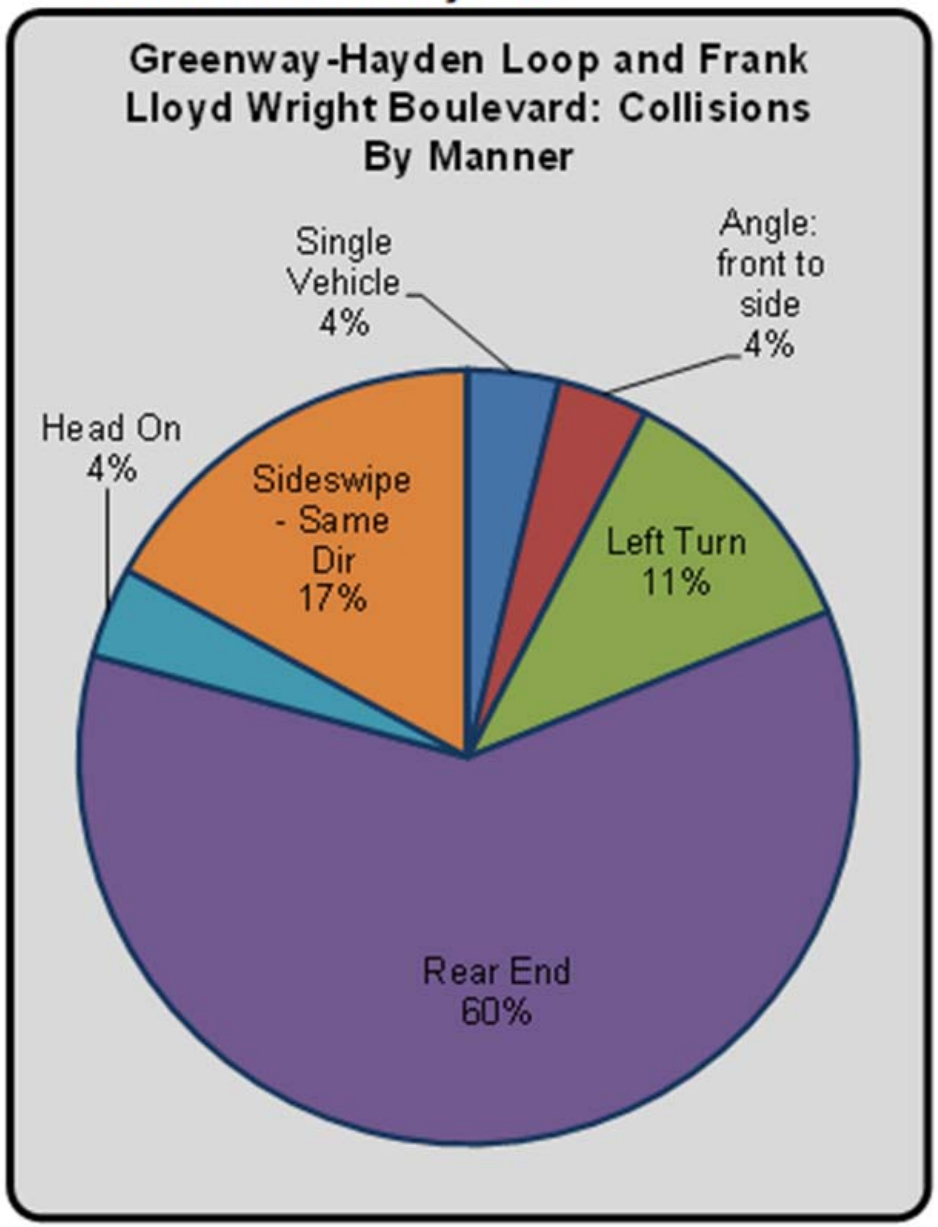
Based on Graph 1 above, there is a significant collision trend unique to this location between the hours of 12 p.m. and 4 p.m. that does not appear to be based directly on peak travel periods. The percentage of collisions at 12 p.m. is more than double the citywide average at that time.

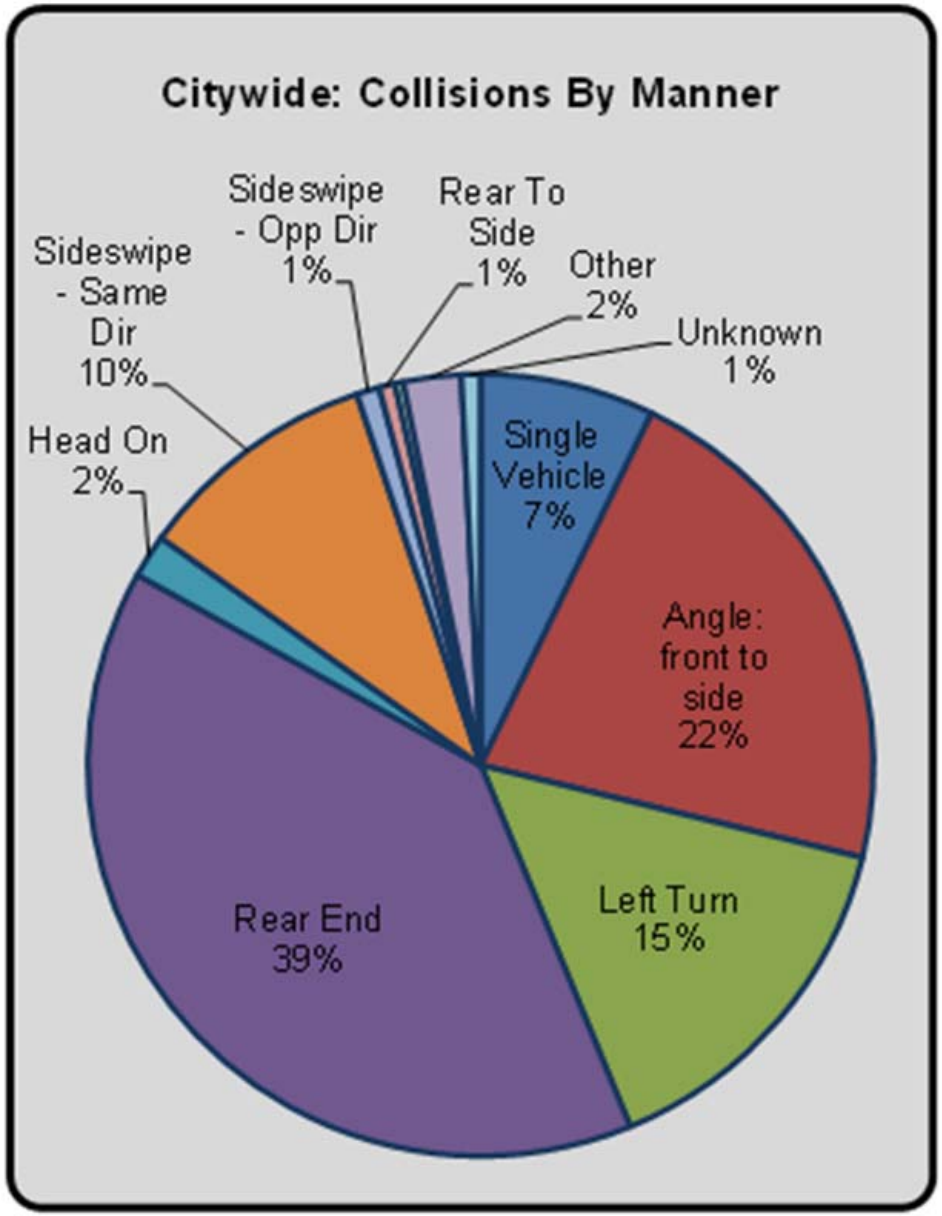
Graph 2: Collisions by Month of Year: Greenway-Hayden Loop and Frank Lloyd Wright Boulevard



Collision percentages at Greenway-Hayden Loop and Frank Lloyd Wright Boulevard based on month of year are relatively consistent with the citywide average throughout most months of the year. However, the percentages are significantly higher than the citywide average in July, September, and December.

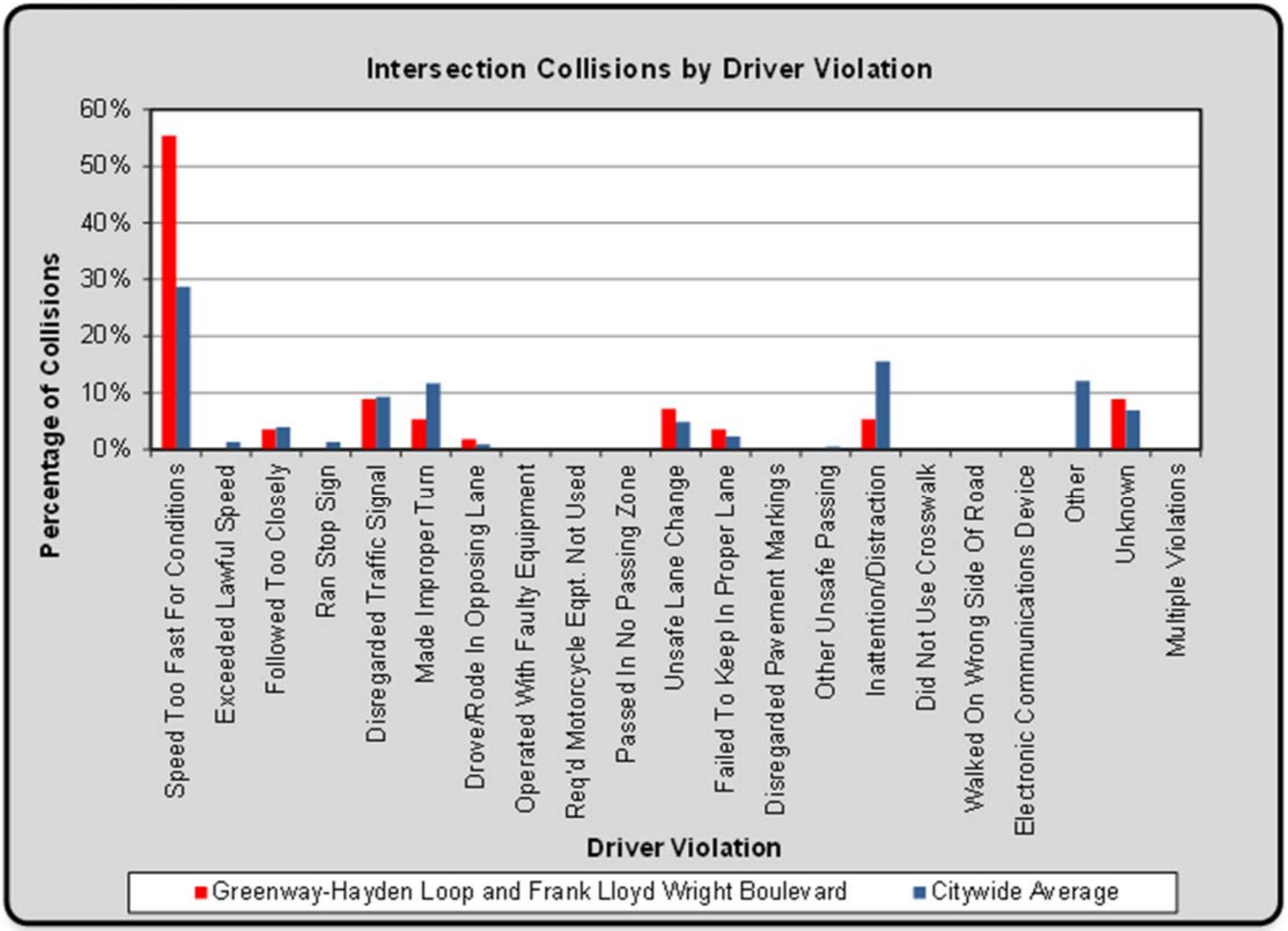
Graphs 3 and 4: Collisions by Manner: Greenway-Hayden Loop and Frank Lloyd Wright Boulevard and Citywide





Comparison of collision percentage by manner with citywide averages reveals that rear-end collisions are 50% higher at Greenway-Hayden Loop and Frank Lloyd Wright Boulevard than citywide. Left-turn collisions are comparable, and angle collisions are significantly less than the citywide average. This is consistent with the rear-end collision trend observed from the collision diagram.

Graph 5: Collisions by Driver Violation: Greenway-Hayden Loop and Frank Lloyd Wright Boulevard



Comparison of driver violation percentages at Greenway-Hayden Loop and Frank Lloyd Wright Boulevard reveals that the most significant inconsistency is the violation of "Speed Too Fast for Conditions". This driver violation is consistent with rear-end collisions. The percentage of this violation at the intersection is approximately twice that of the citywide average.